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EVALUATION OF SOUTHERN PINE BEETLE INFESTATION ON THE CLINCH DISTRICT OF THE JEFFERSON NATIONAL FOREST, VIRGINIA

By

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INTRODUCTION

The Clinch Ranger District of the Jefferson National Forest lies adjacent to Kentucky in the southwest corner of Virginia. Southern pine beetle infestations were found in this general area in early 1975, and the outbreak has intensified significantly through the year, particularly in southeastern Kentucky.

An aerial detection survey in early December disclosed that the beetle is well established on the Clinch District. This evaluation was done to determine the biological status of the insect population, estimate its trend, and appraise the biological advisability of suppression.

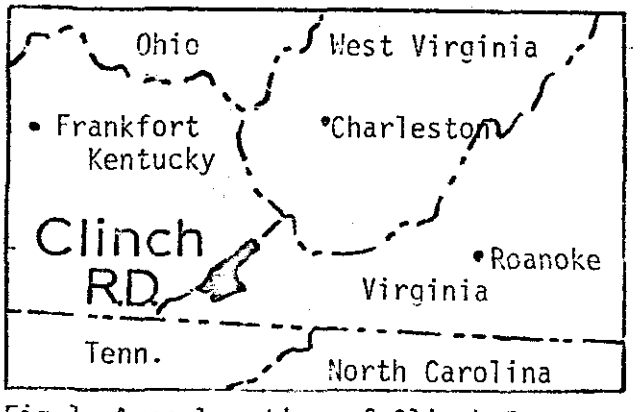

Fig.1 Area location of Clinch Ranger District, Jefferson N. F.

METHODS

Standard aerial sketchmap and ground techniques were used during the evaluation.[1/] The aerial survey was 75 percent. Seven representative beetle spots were checked on the ground to confirm the causal agent and to determine the condition of beetle populations.

TECHNICAL INFORMATION

Insect - Southern pine beetle, *Dendroctonus frontalis* Zimm.

Hosts - Southern pine beetle is a native forest pest that will attack all species of southern yellow pine and occasionally other conifers as well. Susceptible southern yellow pines on the Clinch District are Virginia (*Pinus virginiana* Mill.), shortleaf (*P. echinata* Mill.), and pitch (*P. rigida* Mill.).

Type of Damage - Death of the tree is the result of mining in the cambium by the southern pine beetle as it constructs egg galleries. The beetle also introduces blue stain fungi, *Ceratocystis* spp., which slow down or block conduction of water in the stem. The size of an infestation may range from a single tree to several thousand trees.

Life Cycle of the Beetle - Southern pine beetles attack in pairs and construct a winding gallery in the cambium. Eggs are deposited in niches along the sides of the galleries. The eggs hatch into whitish grubs that further mine the cambium and then construct cells in the bark where they pupate and change into adults. The new adults then mine through the bark to emerge. The complete life cycle takes about a month during the summer, and as many as four or five generations may be produced annually in the area.

RESULTS AND DISCUSSION

Results of the evaluation are summarized in Table 1. The beetle population has increased rapidly over the limited acreage of susceptible host type (1137 acres) as indicated by the high numbers of spots and infested trees per thousand acres of host type. The ratio of green infested to total red

1/ Detection of Forest Pests in the Southeast. 1970. USDA, USFS, SA, S&PF, Div. of FPM, Pub. S&PF-7, Atlanta, Ga. 51 pp.

Table 1. Summary of results of southern pine beetle evaluation on the Clinch District, Jefferson National Forest, 1975.

	Ownership Unit
	Clinch Ranger District
1. Results compiled from data collected during the aerial phase of the evaluation:	
Survey type	Sketchmap
Date of aerial survey	12/11/75
Total acreage surveyed	327,905
Total susceptible host type	1,137
Total number of spots within the survey boundary	57
Spots per M acre of host type	50
Average spot size (trees)	61
Range of spot sizes (trees)	2-1500
2. Results compiled from data collected during the ground and aerial phases of the evaluation:	
Date of ground phase	12/16/75
Infested trees per M acre of host type	2,426
Total number of infested trees within the survey boundary	2,758
Ratio of green infested to total red and fading trees	1:35
Total volume of infested trees	38,600 cu. ft.

and fading trees is low. This is because new attacks have ceased with the advent of winter weather, and most infested trees have faded or turned red. Seventy-eight percent of red and faded trees are infested.

Beetle spots are widely distributed on the District. One area immediately west of Oreton on Powell Mountain has a particularly high incidence of spots.

The southern pine beetle infestation is a definite threat to the susceptible host type on the District. The advisability and justification for suppression will depend largely on the value of the limited pine type and the results of a benefit/cost evaluation.

RECOMMENDATIONS

If a southern pine beetle suppression project is conducted on the District, guidelines should be followed as presented in the 5250 section of the Forest Service Manual:

1. Removal of Infested Trees by Commercial Sale or Administrative Use. When infested trees of merchantable size are accessible, they should be removed by commercial sale or administrative use procedures. Logging of the infested material should begin immediately. Contract time limits should insure rapid removal.

   Where practical, and if host type is present, a 40- to 70-foot buffer strip should be marked and cut adjacent to and ahead of the most recently infested trees. This practice is effective in reducing the possibility of "breakouts". When only a small volume of infested merchantable material occurs in a spot, noninfested trees surrounding the spot may be marked to provide an operable cut.

   The order of priority for removing beetle infested timber from a spot should be as follows:

   Trees having nearly developed broods (usually the red and fading trees)

   Trees having young broods (usually the green, recently infested trees)

   Trees in the buffer zone.

2. Piling and Burning. Unmerchantable or inaccessible southern pine beetle infestations can be suppressed by cutting, piling, and thoroughly burning the bark of infested trees. The entire bark surface must be thoroughly burned to insure effective control. The order of priority for cutting, piling, and burning infested

trees, particularly the large spots, is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts" every effort should be made to locate and treat all green infested trees during the piling and burning operation.

3. Chemical Control. Chemical formulation recommended for southern pine beetle control is a 1/2 percent lindane spray with No. 2 fuel oil as the carrier. This may be formulated from a 20 percent lindane emulsifiable concentrate or oil concentrate at the rate of 11 pints of concentrate in enough fuel oil to make 55 gallons of spray. (Ratio of one part 20 percent lindane EC to 39 parts No. 2 diesel fuel).

   Cut, limb, and buck all infested trees into workable lengths. Spray the infested bark surface to the point of run-off. A compressed air sprayer (3-gallon capacity or equivalent) is an ideal applicator. Infested logs must be turned two or three times to insure complete treatment of infested bark. Spray stumps and bark removed by woodpeckers. Low pressure sprayers may be used to treat large, accessible infestations.

   The order of priority for cutting and spraying infested trees in large spots is the same as paragraph (1) under removal of infested trees by commercial sale or administrative use. Cutting a buffer strip is not recommended. To reduce the possibility of "breakouts", every effort should be made to locate and treat all green infested trees during the chemical control operation.

   Never spray trees from which southern pine beetle brood has emerged. Natural enemies of the southern pine beetle in these trees can then complete their development. To prevent aerial spotters from mapping treated spots, cut trees with red needles from which beetles have emerged.

   Instructions for minimizing the adverse effects of mixing, transporting and storing pesticides, applying pesticides and disposing of pesticide containers and excess chemicals are outlined in section 8.3 of the Forest Service Health and Safety Code and FSM 5242.21. Detailed safety procedures should be outlined in the project suppression plan.

4. Reexamination of Treated Areas. Reexamine areas where infested trees were removed by commercial sales, piled and burned, or chemically treated within two or three weeks after treatment to check for additional infested trees. If additional trees are found, treat them.

PRECAUTIONARY PESTICIDE USE STATEMENT

Pesticides used improperly can be injurious to man, animals, and plants. Follow the directions and heed all precautions on the labels.

Store pesticides in original containers under lock and key -- out of the reach of children and animals -- away from food and feed.

Apply pesticides so that they do not endanger humans, livestock, crops, beneficial insects, fish, and wildlife. Do not apply pesticides when there is danger of drift, when honey bees or other pollinating insects are visiting plants, or in ways that may contaminate water or leave illegal residues.

Avoid prolonged inhalation of pesticide sprays or dusts; wear protective clothing and equipment if specified on the container.

If your handsbecome contaminated with a pesticide, do not eat or drink until you have washed. In case a pesticide is swallowed or gets in the eyes, follow the first aid treatment given on the label, and get prompt medical attention. If a pesticide is spilled on your skin or clothing, remove clothing immediately and wash skin thoroughly.

Do not clean spray equipment or dump excess spray material near ponds, streams, or wells. Because it is difficult to remove all traces of herbicides from equipment, do not use the same equipment for insecticides or fungicides that you use for herbicides.

Dispose of empty pesticide containers promptly. Have them buried at a sanitary land-fill dump, or crush and bury them in a level, isolated place.

NOTE: Some States have restrictions on the use of certain pesticides. Check your State and local regulations. Also, because registrations of pesticides are under constant review by the U.S. Department of Agriculture, consult your county agricultural agent or State Extension specialist to be sure the intended use is still registered.